

# CONTEXTUAL FACTORS ASSOCIATED WITH CERVICAL CANCER

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**O. Ya. Vovk<sup>1</sup>, I. A. Holovanova<sup>1</sup>, Alla Podvin<sup>1</sup>, I. U. Popovuch<sup>1</sup>, O. V. Filatova<sup>1</sup>, O. D. Havlovsky<sup>2</sup>, N. O. Liakhova<sup>1</sup>**<sup>1</sup>POLTAVA STATE MEDICAL UNIVERSITY, POLTAVA, UKRAINE<sup>2</sup>PRAT «MIRHORODKURORT», POLTAVA, UKRAINE

## ABSTRACT

**The aim:** The aim of the study is to determine the risk factors associated with cervical cancer.

**Materials and methods:** 195 participants took part in the study, including 100 cases and 95 healthy people; participation was voluntary. The association of risk factors with cervical cancer was tested using the chi-square test and odds ratio. The use of these methods has been agreed with the ethics commission of the Poltava State Medical University and meets the requirements of the Declaration of Helsinki.

**Results:** Women who live in the village were 64.6% less likely to get sick than those who live in the city, those who assessed their financial situation as unsatisfactory 2.1 times more often have a chance of CC. Childless women are 2.4 times more likely to get sick than those who have children.

**Conclusions:** Various groups of contextual risk factors for cervical cancer have been established. The main ones are behavioral factors related to the diet and diet; socio-economic factors and medical factors. It was also established that the place of residence of women influences the probability of the occurrence of RSM.

**KEY WORDS:** oncogynecology, visual forms of cancer, risk factors, organization of medical care

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## INTRODUCTION

Cervical cancer is the leading type of cancer among women both in Ukraine and in the global community. During the last decades, in the general structure of oncological diseases, cervical cancer remains among the five most common oncological diseases, ranks second position after breast cancer among malignant neoplasms of the female reproductive system and ranks fourth in the prevalence of cancer among women aged 18-29 [1].

Cervical cancer ranks seventh among the most common types of cancer among women in the WHO European Region, and its share in the structure of the total cancer incidence is about 3.8%. About 300,000 women die from cervical cancer every year. It is relatively rare in high-income countries where screening programs are widely implemented and operating [2].

About 500,000 new cases of cervical cancer are registered and 300,000 women die from this disease annually. The increase in the frequency of CC among women of childbearing age is an extremely acute problem, since this contingent of patients represents not only a reproductively significant part of the population, but also a socially active group [3].

According to the Center for Medical Statistics of the Ministry of Health of Ukraine, in 2020, 12,948 cases of cancer

of the female genital organs were registered in Ukraine, of which 3,319 were cervical cancer.

In 2020, WHO presented the Global Strategy to Accelerate Cervical Cancer Elimination. Through the introduction of vaccination, screening and timely treatment, it is expected to reduce the incidence by 40% by the middle of the century.

In Ukraine, 1 out of 3 cases of cervical cancer is diagnosed in the neglected stages of the disease, which means that it is no longer possible to save patients even with the use of the most advanced treatment methods.

Therefore, conducting new studies aimed at obtaining results about the medical and social risk factors for the development of CC and their in-depth scientific analysis is a solution to the current problem related to women's reproductive health [4].

## THE AIM

The aim of the study is to determine the risk factors associated with cervical cancer.

## MATERIALS AND METHODS

The research was conducted using a quantitative method. A case-control study design was used to evaluate

**Table I.** Socio-demographic profile of women

Changeable	The number of women with CC n=100 abs (%)	Number of healthy women n=95 abs (%)	$\chi^2(df)$ , p	Mean $\pm$ standard deviation
<b>Age</b>				
Up to 30 years	2 (2,0)	18 (18,9)	35,8 <0,001	
31-40	10 (10,0)	24 (25,3)		
41-50	24 (24,0)	27 (28,4)		
51-60	40 (40,0)	18 (18,9)		
61-70	20 (20,0)	6 (6,3)		
71 and older	4 (4,0)	2 (2,1)		
<b>Education</b>				
Average	13 (13,0)	48 (50,5)	39,0 <0,001	
Higher	62 (62,0)	22 (23,2)		
Medium special	25 (25,0)	25 (26,3)		
<b>Place of residence</b>				
Rural resident	46 (46,0)	84 (88,4)	39,4 <0,001	
City resident	54 (54,0)	11 (11,6)		
<b>Employment</b>				
Does not work	59 (59,0)	53 (55,8)	0,2 0,6	48,4 $\pm$ 12,5
Working	41 (41,0)	42 (44,2)		
<b>Working conditions</b>				
Light	15 (15,0)	28 (29,5)	9,7 0,008	
Average	73 (73,0)	49 (51,6)		
Heavy	12 (12,0)	18 (18,9)		
<b>Financial position</b>				
Less than 5000	59 (59,0)	41 (43,2)	19,1 <0,001	
5000-10 000	19 (19,0)	8 (8,4)		
11 000- 15 000	3 (3,0)	1 (1,1)		
More than 15,000	19 (19,0)	45 (47,3)		
<b>Assessment of financial position</b>				
Unsatisfactory	68 (68,0)	48 (50,5)	6,1 0,014	
Satisfactory	32 (32,0)	47 (49,5)		

risk factors. Women who came for an oncological examination to a gynecologist at the Poltava Regional Clinical Hospital were asked to fill out a questionnaire that took into account the risk factors for cervical cancer. The target population consisted of women aged from 20 (min=20) to 85 (max = 85) years. 195 participants took part in the study, including 100 cases and 95 healthy people; participation was voluntary. The inclusion criteria for the cases were women with a diagnosis of cervical cancer. The criteria for inclusion in the control group were women who had not been diagnosed with any cancer and who corresponded to the group of cases by age.

Data were collected using a questionnaire, which was divided into blocks: demographic, economic, behavior-

al, history of reproductive health, heredity and relation to preventive examinations.

Data entry and statistical analysis were performed using R Statistics.

Data were analyzed using descriptive statistics, i.e. mean, median, mode and standard deviation. Baseline categorical and continuous variables were compared between groups using the chi-square test with Yate's correction. The association of risk factors with cervical cancer was tested using the chi-square test and odds ratio. As for eating behavior, consumption of products 1-2 times a week was considered infrequent, and 3 or more - regular consumption. Risk factors that significantly increase the likelihood of cervical cancer have been analyzed.  $p < 0.05$  was considered statistically significant.

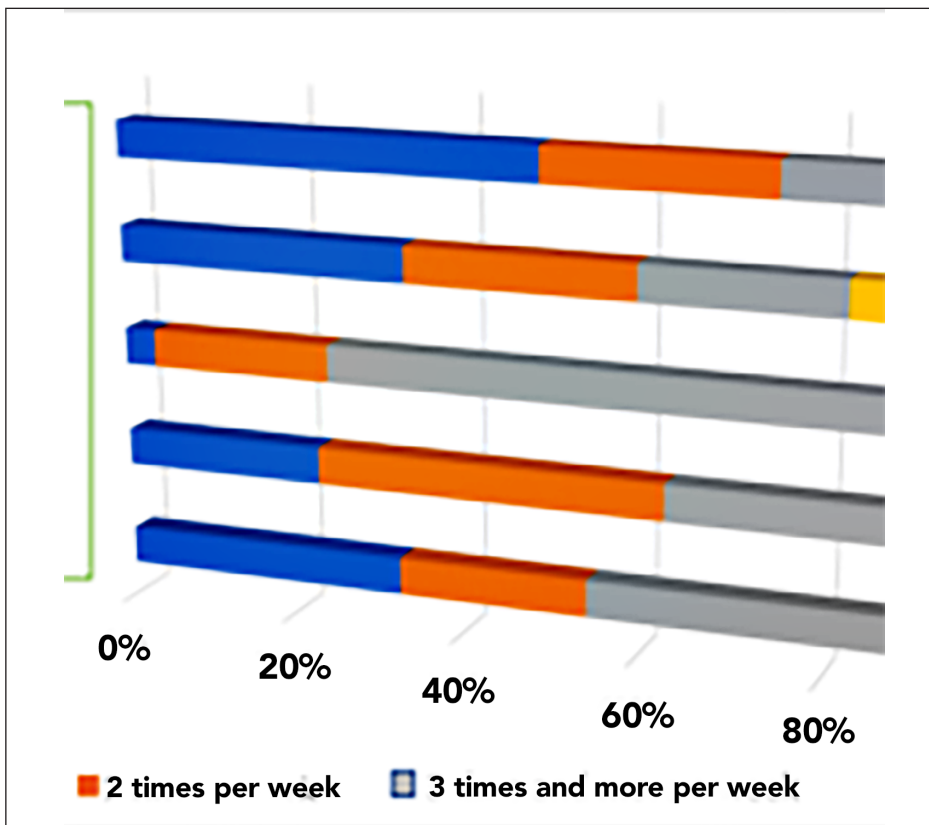


Fig.1. Frequency of food consumption.

## RESULTS

Cervical cancer is a cancer caused by an infectious disease [6]. In particular, two types of HPV, HPV 16 and 18, account for approximately 70% of cervical cancer cases [7]. Despite the fact that HPV-infection is an obligatory cause in the etiology of cervical cancer, HPV-infection alone is not a sufficient cause of the occurrence of cases [8]. Several epidemiological studies have shown the role of various demographic, sexual and reproductive factors in the development of HPV infection in cervical carcinoma [9 - 14].

Despite declining trends in the incidence and mortality of cervical cancer, it remains a serious health problem [15,16]. Therefore, conducting new studies aimed at obtaining results on the medical and social risk factors for the development of cervical cancer (CC) and their in-depth scientific analysis is a solution to the current problem related to the reproductive health of women.

Table I shows that the average age of the respondents of the two groups is  $48.4 \pm 12.5$  years. A significant majority of the participants had a higher education, average working conditions, a minimum income of UAH 5,000, were residents of rural areas and assessed their financial situation as unsatisfactory.

Table II shows the results of the odds ratio assessment. We analyzed prognostic factors, such as socio-demographic, physical development, behavioral, use of medical services, concomitant diseases, heredity.

*Socio-demographic factors.* Women who have assessed their financial situation as unsatisfactory and those who are childless are more likely to get CC. In women living in rural areas, there was significant association with CC ( $p < 0.001$ ), but the odds ratio was less than one.

*Physical development.* In women with increased BMI, the risk of cervical cancer probably increased by 2 times.

*Behavioral factors.* The odds ratio was higher in women who did not adhere to the diet.

*Use of medical services.* Women who did not visit prophylactic examinations regularly and those who had a history of abortions had a higher chance of developing CC.

*Associated diseases.* Among concomitant diseases, inflammatory processes of the genital organs served as a risk for the development of an oncological process in the uterus.

*Heredity* was important only when one of the relatives had CC and increased the risk of developing the disease by as much as 80 times.

Cervical cancer has a high mortality rate among women and worsens their lives. Identifying the most important factors of cancer is the most important task of the prevention strategy and can even help in early diagnosis. Among the factors that cannot be overlooked is the influence of diet. Therefore, the next step of the study was to examine the behavioral factors related to

**Table II.** Associations between risk factors and cervical cancer

Questionnaire questions	The number of women with CC (n = 100) abs (%)	Number of healthy women (n = 95) abs (%)	Odds ratio (DI 95%)	$\chi^2$	P
<b>Socio-demographic factors</b>					
Place of residence: village (n = 130)	46 (35,4)	84 (64,6)	0,112 (0,53-0,23)	39,4	<0,001
Place of residence: city (n = 65)	54 (83,1)	11 (16,9)			
Do you work: yes (n=112)	59 (52,7)	53 (47,3)	1,140 (0,65-2,01)	0,2	0,379
Do you work: no (n=83)	41 (49,4)	42 (50,6)			
Higher Education (n=144)	74 (51,4)	70 (48,6)	1,016 (0,54-1,93)	0,003	0,545
Secondary education (n=51)	26 (51,0)	25 (49,0)			
The financial position is unsatisfactory (n=116)	68 (56,8)	48 (41,4)	2,081 (1,16-3,72)	6,1	0,010
The financial position is satisfactory (n=79)	32 (40,5)	47 (59,5)			
There are no children (n=35)	24 (68,6)	11 (31,4)	2,411 (1,11-5,25)	5,1	0,018
There are children (n=160)	76 (47,5)	84 (52,5)			
<b>Physical development</b>					
Increased BMI	70 (58,8)	49 (41,2)	2,19 (1,20-3,90)	6,9	0,006
BMI is within normal limits (19-24)	30 (39,5)	46 (60,5)			
<b>Behavioral factors</b>					
Diet: no (n=152)	73 (48,0)	79 (52,0)	0,548 (0,27-1,10)	2,9	0,062
Diet: yes (n=43)	27 (62,8)	16 (37,2)			
Food regime: no (n=65)	43 (66,2)	22 (33,8)	2,503 (1,35-4,65)	8,6	0,003
Food regime: yes (n=130)	57 (43,8)	73 (56,2)			
Smokes (n=39)	22 (56,4)	17 (43,6)	1,294 (0,64-2,62)	0,5	0,296
Does not smoke (n=156)	78 (50)	78 (50)			
<b>Use of medical services</b>					
Pro view: no (n=98)	62 (63,3)	36 (36,7)	2,674 (1,50-4,77)	11,3	0,001
Pro view: yes (n=97)	38 (39,2)	59 (60,8)			
There was an abortion (n=123)	81 (65,9)	42 (34,1)	5,380 (2,83-10,23)	28,3	<0,001
There were no abortions (n=72)	19 (26,4)	53 (73,6)			
She used oral contraceptives (n=24)	14 (58,3)	10 (41,7)	1,384 (0,58-3,29)	0,5	0,302
She did not use oral contraceptives (n=171)	86 (50,3)	85 (49,7)			
<b>Associated diseases</b>					
Inflammatory processes of genital organs: yes (n=140)	99 (70,7)	41 (29,3)	130,390 (17,45-174,35)	75,0	<0,001
Inflammatory processes of genital organs: no (n=55)	1 (1,8)	54 (98,2)			
Endocrine diseases: no (n=172)	88 (51,2)	84 (48,8)	0,960 (0,40-2,30)	0,008	0,553
Endocrine diseases: yes (n=23)	12 (52,2)	11 (47,8)			
<b>Heredity</b>					
Did any of your relatives suffer from CC: yes (n=47)	46 (97,9)	1 (2,1)	80,074 (10,74-97,15)	53,8	<0,001
Did any of the relatives suffer from CC: no (n=148)	54 (36,5)	94 (63,5)			
Did any of your relatives suffer from breast cancer: yes (n=4)	0 (0,0)	4 (100)	2,099 (1,81-2,44)	4,2	0,055
Did any of the relatives suffer from breast cancer: no (n=191)	100 (52,4)	91 (47,6)			

**Table III.** Associations between eating habits and cervical cancer

Questionnaire questions	The number of women with CC (n = 100) abs (%)	Number of healthy women (n = 95) abs (%)	Odds ratio (DI 95%)	$\chi^2$	P
Fish consumption: does not consume or once a week (n = 153)	86 (56,2)	67 (43,8)	2,567 (1,25-5,26)	6,902	0,007
Eating fish: two to three times or more (n = 42)	14 (33,3)	28 (48,7)			
Meat: three or more (n = 48)	69 (69,0)	22 (23,2)	7,3 (3,90-13,90)	41,135	<0,001
Meat: up to two times (n = 147)	31 (31,0)	73 (76,8)			
Vegetables: rarely (n = 48)	26 (54,2)	22 (45,8)	1,166 (0,61-2,24)	0,212	0,385
Vegetables: often (n = 147)	74 (50,3)	73 (49,7)			
Fruits: rarely (n = 106)	86 (81,1)	20 (18,9)	23,036 (10,88-48,76)	82,830	<0,001
Fruits: often (n = 89)	14 (15,7)	75 (84,3)			
Dairy products: rarely (n = 125)	73 (58,4)	52 (41,6)	2,236 (1,23-4,07)	7,062	0,006

nutrition that affect cervical cancer. Figure 1 shows that most women eat vegetables three times a week and fish - almost half a week or less.

As shown in Table III, those who do not often consume fish, fruits, and dairy products, but instead often consume meat products, have a greater chance of developing CC.

**DISCUSSION**

The conducted study showed that an unsatisfactory financial situation, childlessness, increased BMI, non-compliance with the diet, abortions and inflammatory processes of the genital organs in the anamnesis, irregular prophylactic examinations, heredity for CC increased the chances of its occurrence.

Unsatisfactory financial status was shown as a risk factor for PCM in the study by Shield TS et al., and in addition, such risk factors as low level of education and genital infection were found in this study. In our questionnaire, it was not specified exactly which inflammatory processes of the genital organs were present in women, and it can be concluded that inflammation of both infectious and non-infectious genesis are risk factors for CC [14,17].

Irregular preventive examinations indicate women’s ignorance of the need to undergo them, which was consistent with the study conducted by Tebeu PM at al. on the relationship to CC and awareness of it. The fact that women from rural areas had a lower chance of developing RSM may also indicate low early detection, untimely diagnosis due, on the one hand, to lack of awareness of the need

for preventive examinations, and on the other hand, due to lower accessibility to medical care in the village. In addition, if a woman has probable signs of CC, she may not go to a health care facility for many reasons, such as inactivity, poor socioeconomic status, lack of transportation, financial problems, etc. [18]. An increased BMI was one of the risk factors for CC. In a meta-analysis by Poorolajal J et al, it was shown that overweight is not associated with an increased risk of cervical cancer, but obesity is weakly associated with an increased risk of cervical cancer [19].

Analysis of food behavior outlined that the consumption of meat more than 3 times a week, fruit and dairy products - twice or less a week, and neglecting the consumption of fish are risk factors for CC. A study conducted by Barchitta et al. shows that a high intake of red and processed meat, sauces, chips and snacks with a low intake of olive oil in a Western diet was associated with a higher risk of HPV. In contrast, a Mediterranean diet consisting of vegetables, legumes, fruits and nuts, cereals, fish and a high ratio of unsaturated lipids to saturated lipids had a lower risk of CC [20, 21].

Thus, the identified risk factors will later become factors for justifying the need to develop a model for early detection and prevention of cervical cancer.

**CONCLUSIONS**

As a result of the research, various groups of factors that increase the risk of cervical cancer in women were established, namely:



1. Factors related to the diet. Women who consumed an insufficient amount of fruit, neglected the consumption of fish and dairy products, and preferred meat in their diet - had a greater chance of developing PCM.
2. Socio-economic factors, such as a low level of education, lack of awareness about early detection of cervical cancer, unsatisfactory financial situation of women increased the risk of cervical cancer.
3. At the same time, it was established that medico-de-

mographic factors, such as the absence of children, a history of abortion, hereditary predisposition (that is, the presence of this oncological disease in a woman's relatives) increased the chances of PCM.

It should be noted separately that the place of residence affects the probability of cervical cancer. According to the results of the survey, women living in rural areas had a lower chance of developing PCM, and this is most likely due to low awareness and seeking medical help by women.

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**ORCID and contributionship:**

O. Ya. Vovk: 0000-0003-4364-5493<sup>A,E</sup>

I. A. Holovanova: 0000-0002-8114-8319<sup>E,F</sup>

Alla Podvin: 0009-0008-5946-7621<sup>B,C,D</sup>

I. U. Popovuch: 0000-0003-1720-095X<sup>B,D</sup>

O. V. Filatova: 0000-0001-6264-570X<sup>B,F</sup>

O. D. Havlovsky: 0000-0002-0310-0766<sup>B,E</sup>

N. O. Liakhova: 0000-0003-0503-9935<sup>B,C,D</sup>

**Conflict of interest:**

*The Authors declare no conflict of interest.*

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**CORRESPONDING AUTHOR****Alla Podvin**

Poltava State Medical University, Poltava, Ukraine

e-mail: allapodvin@ukr.net

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**A** - Work concept and design, **B** - Data collection and analysis, **C** - Responsibility for statistical analysis, **D** - Writing the article, **E** - Critical review, **F** - Final approval of the article

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